## REMARKS/ARGUMENTS

Claims 1-11 are currently pending in this application. Claims 1 and 10 have been amended only to correct typographical errors. Claim 12 has been canceled without prejudice. No new matter has been added by the amendments.

In the Action, claims 1-5 and 7-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,243,522 (Allan et al.). Claim 6 was rejected under 35 U.S.C. §103(a) as being unpatentable over Allan et al. in view of U.S. Patent No. 6,091,872 (Katoot). Applicants respectfully traverse these rejections as applied to the pending claims 1-11. Claim 12 has been canceled, so the rejection of claim 12 is moot.

Referring to Applicants' Figures 1A, 2A, and 3A, one embodiment of Applicants' invention is directed to a graded index fiber. The graded index fiber includes a drawn and fused preform 10, 20, 30 which includes low index rods 11-15, 21, 31 that each have only a single refractive index. The preforms 10, 20, 30 include at least one high index rod 16, 22, 32 having only a single refractive index. The rods are arranged in a predetermined pattern.

To establish a *prima facie* case of obviousness, "the prior art reference (or references when combined) must teach or suggest all the claim limitations" (MPEP § 2142).

Applicants' claim 1 recites, *inter alia,* "a drawn and fused preform comprising

a plurality of low index rods, each having only a single refractive index, and at least one high index rod, having only a single refractive index ...." Applicants' claim 10 recites, *inter alia*, "arranging a plurality of low index rods, each having a single refractive index, and a plurality of high index rods, each having a single refractive index, in a predetermined pattern to form a preform..."

Allan et al. are directed to a photonic crystal fiber that can be manufactured without a porous clad. Prior to Allan et al., photonic crystal fibers included a porous clad layer that contained an array of voids that served to change the effective refractive index of the clad layer to control the properties of the waveguide fiber (specification, column 1, lines 12-17). The manufacture of porous clad photonic crystal fibers proved difficult because the porosity volume and distribution had to be controlled during the drawing of the preform (specification, column 1, lines 34-36). Drawing the porous clad preform required maintaining a precise balance of pressure to maintain the equilibrium between the pressure within the pores versus the viscous forces of the material surrounding the pores under the extreme conditions experienced by the preform during drawing (specification, column 1, lines 41-46). This process was a complex manufacturing step that limited the speed of manufacture. This need for precise pressure control throughout the preform during drawing was eliminated by Allan et al. by substituting the less complex step of controlling the fabrication of the clad rod that is later used as part of the preform

for the photonic crystal fiber (specification, column 9, liens 1-6). All of the preforms described in Allan et al. require clad rods that include a matrix material and at least one additional material each having a different refractive index (specification, column 2, lines 35-38; column, lines 24-28; and column 10, lines 40-47). All of the disclosed photonic crystal fiber preforms include clad rods that have two components that each possess different refractive indexes (column 6, lines 47-49). **It is the use of clad rods having multiple refractive indexes that allows for the elimination of a porous clad layer on the photonic crystal fiber.** Referring to Figures 3A and 8 of Allan et al., each of the embodiments of the Allan et al. preform incorporate cylindrical clad rods 22, 49 that includes material having at least two refractive indexes. As detailed above, this is necessary to allow the properties of the Allan et al. photonic crystal fibers (such as, mode field diameter or total dispersion) to be adjusted without using a porous cladding. There is no disclosure, teaching, or suggestion in Allan et al. of using a preform formed of clad rods only having a single refractive index. *To the contrary, Allan et al., specifically teaches the use of clad rods having at least two materials with different refractive indexes to allow the regulation of photonic crystal fiber properties without using a porous cladding.*

Applicants respectfully submit that Allan et al. fail to disclose, teach, or suggest Applicants' elements, recited in claims 1 and 10 of a drawn and fused

preform of low and high refractive index rods each having only a single refractive index. As detailed above, Allan et al. specifically teaches the use of clad rods having multiple refractive indexes as a method of eliminating the complex drawing process that is necessary when manufacturing photonic crystal fibers having a porous clad layer. Accordingly, Applicants respectfully submit that Allan et al. fail to disclose, teach, or suggest each of the elements of Applicants' claims 1 and 10.

To properly combine references to form a section 103 rejection:

> The proposed modification cannot render the prior art unsatisfactory for its intended purpose. . . . The proposed modification cannot change the principle of operation of a reference. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie obvious*.
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> MPEP § 2143.01 (emphasis added).

Applicants respectfully submit that modifying Allan et al. to form Applicants' claimed invention renders Allan et al. unsatisfactory for its intended purpose. As detailed above, Allan et al. eliminate the complex problem of maintaining critical pressures during the drawing process of photonic crystal fibers necessary when using a porous cladding by using a preform that includes clad rods having multiple refractive indexes. The Allan et al. clad rods having multiple refractive indexes are

necessary to allow the properties of the resulting photonic crystal fiber to be controlled. Modifying Allan et al. to use clad rods only having a single refractive index is completely opposite to the specific teachings of Allan et al. and would cause the Allan et al. photonic crystal fiber to have unsatisfactory waveguide properties. Furthermore, modifying Allan et al. to form Applicants' claimed invention would change the explicit principle of operation of Allan et al. which is to use clad rods having multiple refractive indexes to eliminate the need to control pressures during the preform drawing step to manufacture photonic crystal fibers having desired waveguide properties. Accordingly, Applicants respectfully submit that Allan et al. cannot properly be used as part of a Section 103 rejection for Applicants' claims as modifying Allan et al. to form Applicants' claimed invention results in Allan et al being unsatisfactory for its intended purpose and changes the principle of operation of Allan et al. Accordingly, Applicants respectfully submit that the teachings of Allan et al. are not sufficient to render the current claims *prima facie* obvious.

Applicants respectfully submit that claims 1 and 10 are patentable over Allan et al because: (1) Allan et al. fail to disclose, teach, or suggest each of Applicants' claimed elements; (2) modifying Allan et al. to form Applicants' claimed invention would result in Allan et al. being unsatisfactory for its intended purpose; (3) modifying Allan et al. to form Applicants' claimed invention would require changing of the principle of operation of Allan et al.; and (4) the teachings of Allan et al. are

not sufficient to render the current claims *prima facie* obvious. Additionally, Applicants respectfully submit that claims 2-9 and 11 each depend from one claims of 1 and 10, and accordingly, are also patentable over Allan et al. Claim 12 has been canceled, so the rejection of that claim is moot.

Applicants respectfully request the Examiner reconsider and withdraw this Section 103 rejection of claims 1-5 and 7-12.

Claim 6 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Allan et al. in view of U.S. patent 6,091,872 ("Katoot"). Essentially, this rejection relies on Allan et al. to teach each of the elements of claim 1 and only relies on Katoot to teach the use of low and high index rods formed of a polymer. As detailed above, Allan et al.: does not disclose each of the elements of Applicants' claim 1; cannot be modified to form Applicants' claimed invention without rendering Allan et al. unsatisfactory for its intended purpose; and cannot be modified to form Applicants' claimed invention without changing the principle of operation of Allan et al. Katoot does not remedy any of the above deficiencies in Allan et al. Accordingly, Applicants respectfully submit that claim 6 is patentable over the combination of Allan et al. and Katoot for each of the reasons recited above in connection with claim 1.

Applicants respectfully request that the Examiner reconsider and withdraw this section 103 rejection of claim 6.

It is noted that the present application is a continuation in part and claims priority to PCT application PCT/US02/23751, filed July 26, 2002, and also claims priority to U.S. Patent Application No. 09/921,113, filed on August 1, 2001 (now abandoned). Claims 1 and 10, the only pending independent claims in the present application, include the same features of independent claims 1 and 10 in parent Patent Application No. 09/921,113, which defined over the above-noted references.

In the present Action, the rejections and arguments presented closely correspond to the rejections and arguments presented in the Office Action dated April 3, 2003, copy enclosed, in the parent Patent Application No. 09/921,113. A Reply by the Applicants dated July 3, 2003, copy enclosed, was filed in response to the April 3, 2003 Action in the parent application. In view of that Reply, an Office Action dated July 30, 2003, copy enclosed, stated that the Applicants' arguments were persuasive and withdrew the prior rejections (see page 4).

Applicants respectfully submit that in view of the arguments previously presented and the withdrawal of the rejections in the July 30, 2003 Action in Application No. 09/921,113, the present rejections should also be withdrawn for the same reasons. Accordingly, Applicants respectfully request withdrawal of the present rejections.

If the Examiner believes that a telephone interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing remarks, Applicants respectfully submit that the present application, including claims 1-11, is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

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